1. A method of behavior recognition, comprising the steps of:

analyzing a gesture-making target utilizing a plurality of gesture-recognition modules, each outputting information relating to target location and gesture type;

designating certain target locations and gesture types as predefined behaviors;

comparing the information from the gesture-recognition modules to the predefined behaviors; and

in the event of a correlation between the output of the gesture-recognition modules and a particular predefined behavior, determining that the behavior of the target includes the particular gesture.

2. The method of claim 1, wherein the target is a human being.

3. The method of claim 1, wherein the target is a group of people.

4. The method of claim 1, wherein the target is a human hand.

5. The method of claim 1, wherein the gesture-recognition modules output information relating to static and dynamic gestures.

6. The method of claim 5, further including the steps of:

deriving the start position of the target, the end position of the target, and the velocity between the start and end positions;

comparing the velocity of the target to a threshold value; and

identifying the gesture as a static gesture if the velocity is below the threshold value, otherwise,

identifying the gesture as a dynamic gesture.

7. The method of claim 1, wherein the step of analyzing the gesture-making target includes the use of a velocity damping terms gesture model.

8. The method of claim 1, wherein the step of analyzing the gesture-making target includes imaging the target.

9. The method of claim 8, further including the step of generating a bounding box around the target.

10. The method of claim 8, further including the step of using an operator to find the edges of the target.

11. The method of claim 1, further including the steps of:

receiving a file of recognized gestures along with their vector descriptions; and

comparing the outputs of the gesture recognition modules to the vector descriptions.

12. The method of claim 1, further including the step of treating a gesture as a dynamic gesture comprising one or more one-dimensional oscillations.

13. The method of claim 12, further including the step of treating a circular motion as a combination of repeating motions in two dimensions having the same magnitude and frequency of oscillation.

14. The method of claim 12, further including the step of deriving complex dynamic gestures by varying phase relationships.

15. The method of claim 12, further including the step of deriving a multi-gesture lexicon based upon clockwise and counter-clockwise large and small circles and one-dimensional lines.

16. The method of claim 12, further including the step of comparing to the next position and velocity of each gesture to one or more predictor bins to determine a gesture's future position and velocity.

17. The method of claim 16, further including the use of a linear-with-offset-component model to discriminate among simple dynamic gestures.

18. The method of claim 16, further including the use of a velocity damping model to discriminate among non-circular dynamic gestures.

19. The method of claim 1, wherein the target includes a vehicle.

20. The method of claim 1, wherein the target includes a weapon.

21. The method of claim 1, wherein the target forms part of a robot.

| | gesture input | | |
|---|---|---|---|
| | slow | medium | fast |
| slow bin | **1.31** | 1.20 | 1.37 |
| medium bin | 14.1 | **0.24** | 1.01 |
| fast bin | 424 | 23.1 | **0.23** |

**Table 1: Residual Errors of Linear with Offset Component Model.**

| | gesture input | | |
|---|---|---|---|
| | slow | medium | fast |
| slow bin | **1.34** | 1.26 | 1.38 |
| medium bin | 9.8 | **0.56** | 1.17 |
| fast bin | 36 | 1.79 | **0.1** |

**Table 2: Residual of Van der Pol Model.**

| | gesture input | | |
|---|---|---|---|
| | slow | medium | fast |
| slow bin | **1.3** | 1.21 | 1.37 |
| medium bin | 14.5 | **0.22** | 0.98 |
| fast bin | 464 | 25.7 | **0.11** |

**Table 3: Residual of Van der Pol with Offset Component Model.**

| | gesture input | | |
|---|---|---|---|
| | slow | medium | fast |
| slow bin | **1.29** | 1.24 | 1.37 |
| medium bin | 14.6 | **0.18** | 1.03 |
| fast bin | 249 | 20.0 | **0.11** |

**Table 4: Residual of Higher Order Terms Model.**

| | gesture input | | |
|---|---|---|---|
| | slow | medium | fast |
| slow bin | **1.28** | 136 | 23.3 |
| medium bin | 13.8 | **0.17** | 1 |
| fast bin | 8770 | 35.9 | **0.09** |

**Table 5: Residual of Velocity Damping Model.**

| | Parameter Values | | | |
|---|---|---|---|---|
| | x-theta-1 | x-theta-2 | y-theta-1 | y-theta-2 |
| slow bin | -0.72 | 149 | -0.73 | 103 |
| medium bin | -16.2 | 3467 | -16.3 | 2348 |
| fast bin | -99.3 | 20384 | -97.1 | 12970 |

**Table 6: Parameter Values for Linear Model.**

| |
|---|
| Parameters for Halt<br>name:halt arm:14 width:32 height:47 xloc:-1 yloc:-1<br>4 4 0 0 0 0 0 0 0 0 0 6 8 10<br>9 8 8 7 4 3 3 3 2 2 1 1 1 1 2<br>17 17 16 12 11 10 10 9 8 1 1 2 4 6 9 |
| Parameters for Turn Right<br>name:go_right arm:11 width:47 height:31 xloc:-1 yloc:0<br>47 27 26 23 8 5 1 1 1 23 4 19 12 14 21<br>31 11 9 7 10 10 9 10 5 2 1 5 8 10 13<br>31 14 10 10 6 5 4 3 2 3 2 1 1 1 2 |
| Parameters for Acknowledge<br>name:acknowledge arm:11 width:38 height:46 xloc:0 yloc:0<br>38 6 6 8 11 12 10 3 2 1 3 3 9 6 12<br>46 23 20 3 1 4 7 2 13 16 17 19 21 22 24<br>46 17 11 2 1 1 2 2 7 3 3 3 4 7 7 |
| Parameters for Freeze (fist)<br>name:freeze arm:14 width:27 height:29 xloc:-1 yloc:-1<br>0 0 0 4 6 6 3 2 2 2 3 6 7 0 8<br>27 12 12 4 4 3 3 3 2 2 2 1 1 1 1<br>27 14 14 13 13 13 4 2 2 2 3 3 1 2 3 |

**Table 7: Parameters for Static Gestures.**

**Table 8: Residual Results for Jumping Jacks Behavior.**

| | Gesture Input from Sensors 1-5 | | | | |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| bin 1 | **0.034** | 0.063 | 0.079 | 0.044 | 0.04 |
| bin 2 | 0.27 | **0.033** | 0.038 | 0.044 | 0.035 |
| bin 3 | 0.382 | 0.031 | **0.029** | 0.039 | 0.034 |
| bin 4 | 9.5 | 0.081 | 0.111 | **0.031** | 0.072 |
| bin 5 | 0.258 | 0.04 | 0.074 | 0.038 | **0.033** |

**Table 9: Residual Results for Walking Behavior.**

| | Gesture Input from Sensors 1-5 | | | | |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| bin 1 | **0.035** | 1008 | 1.24 | 885 | 150 |
| bin 2 | 0.71 | **0.035** | 0.054 | 0.21 | 11.6 |
| bin 3 | 0.075 | 0.906 | **0.034** | 5.94 | 7.12 |
| bin 4 | 0.05 | 0.04 | 0.05 | **0.033** | 0.102 |
| bin 5 | 0.051 | 0.047 | 0.052 | 0.041 | **0.034** |

**Table 10: Residual Results for Running Behavior.**

| | Gesture Input from Sensors 1-5 | | | | |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| bin 1 | **0.031** | 0.207 | 0.037 | 0.042 | 0.041 |
| bin 2 | 2.00E+16 | **0.019** | 6.00E+14 | 2.00E+16 | 3.00E+15 |
| bin 3 | 0.071 | 0.2 | **0.034** | 0.056 | 0.04 |
| bin 4 | 0.95 | 0.2 | 0.08 | **0.032** | 0.035 |
| bin 5 | 0.28 | 0.2 | 0.067 | 0.039 | **0.034** |